



Watershed Master Plan Program 2nd Tranche Proposed Solutions

City Council Work Session: May 6, 2024

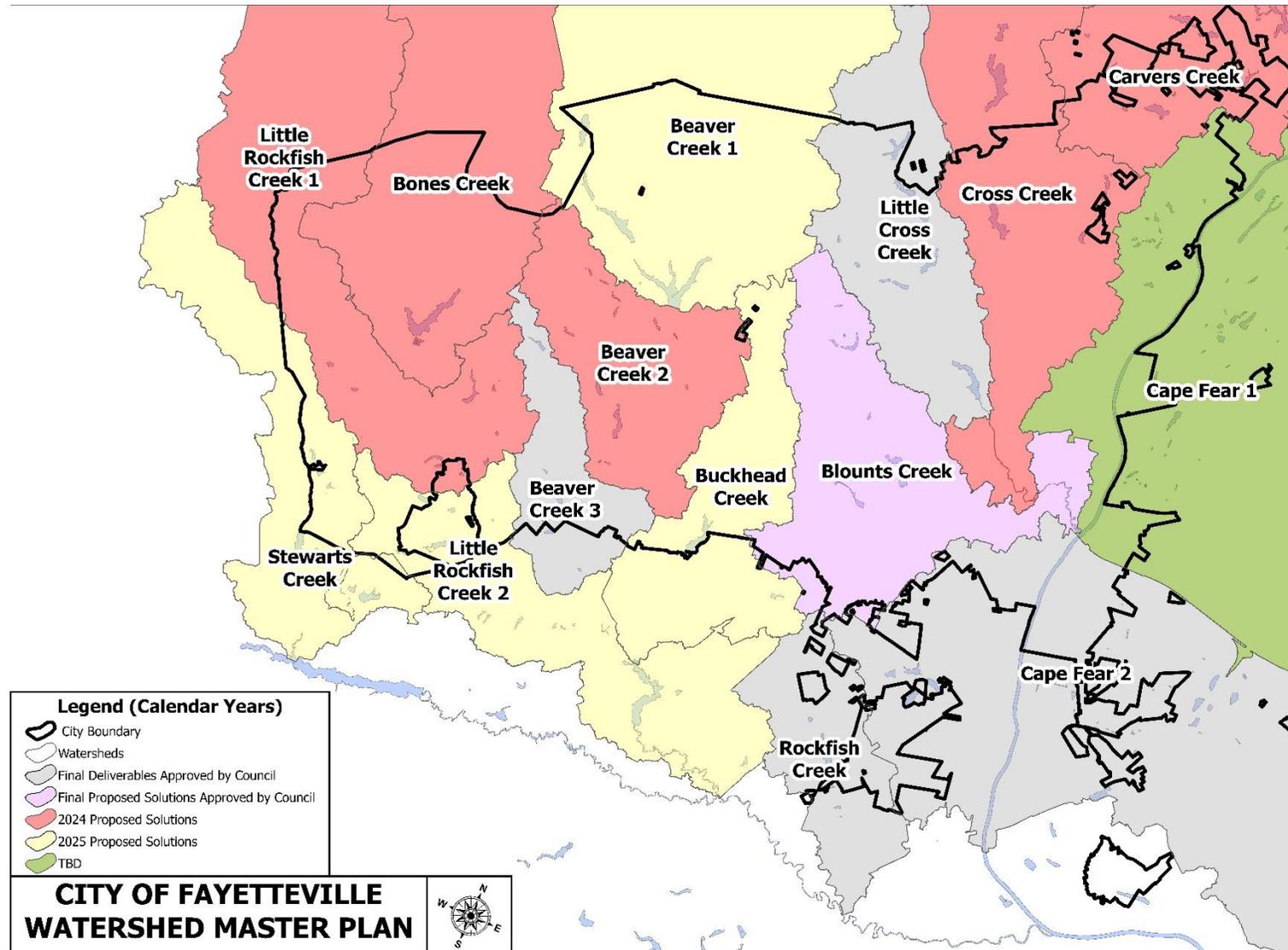


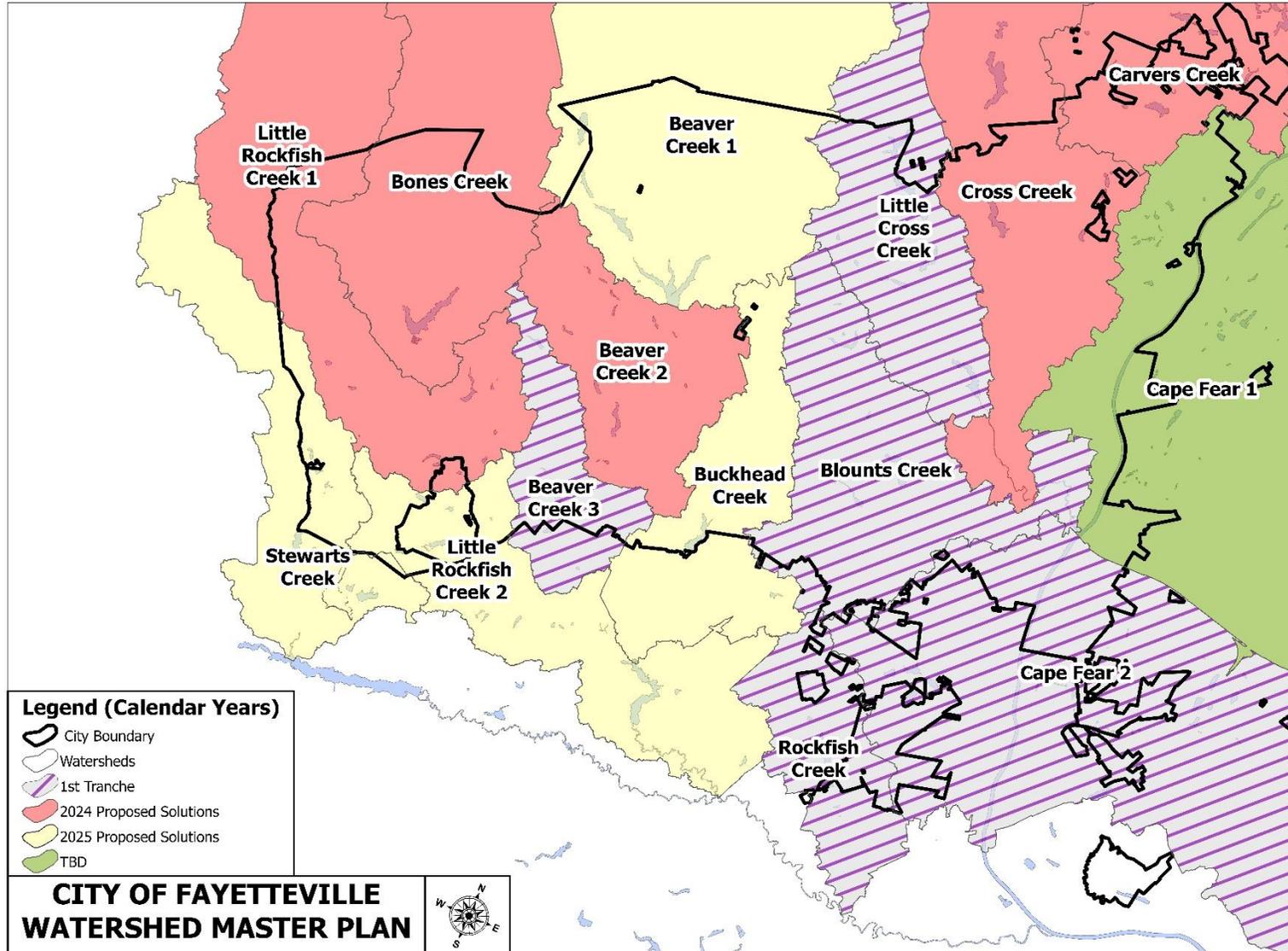
- Provide an overview of Watershed Studies
- Provide a summary of the 1st tranche of proposed solutions that have been taken to Council
- Present the 2nd tranche of proposed solutions from the Watershed Studies
- Provide a schedule for the remaining Watershed Studies
- Request consensus on accepting the proposed solutions from Little Rockfish 1, Bones, and Cross Creek Watersheds



Today's Presentations

- Proposed Solutions for Little Rockfish 1 and Bones Creek (presented by City and Gradient/HDR)
- Proposed Solutions for Cross Creek (presented by Hazen)





Study Area

310 – Total Sub-basins
 109 – Priority I Sub-basins
 12.4 – Sq. Miles

Study Identified

313 – Concern Areas (CAs)
 193 – CAs Selected
 204 – Proposed Solutions

Miles of Impacted Lane Length
 Identified – 74 | Resolved – 49

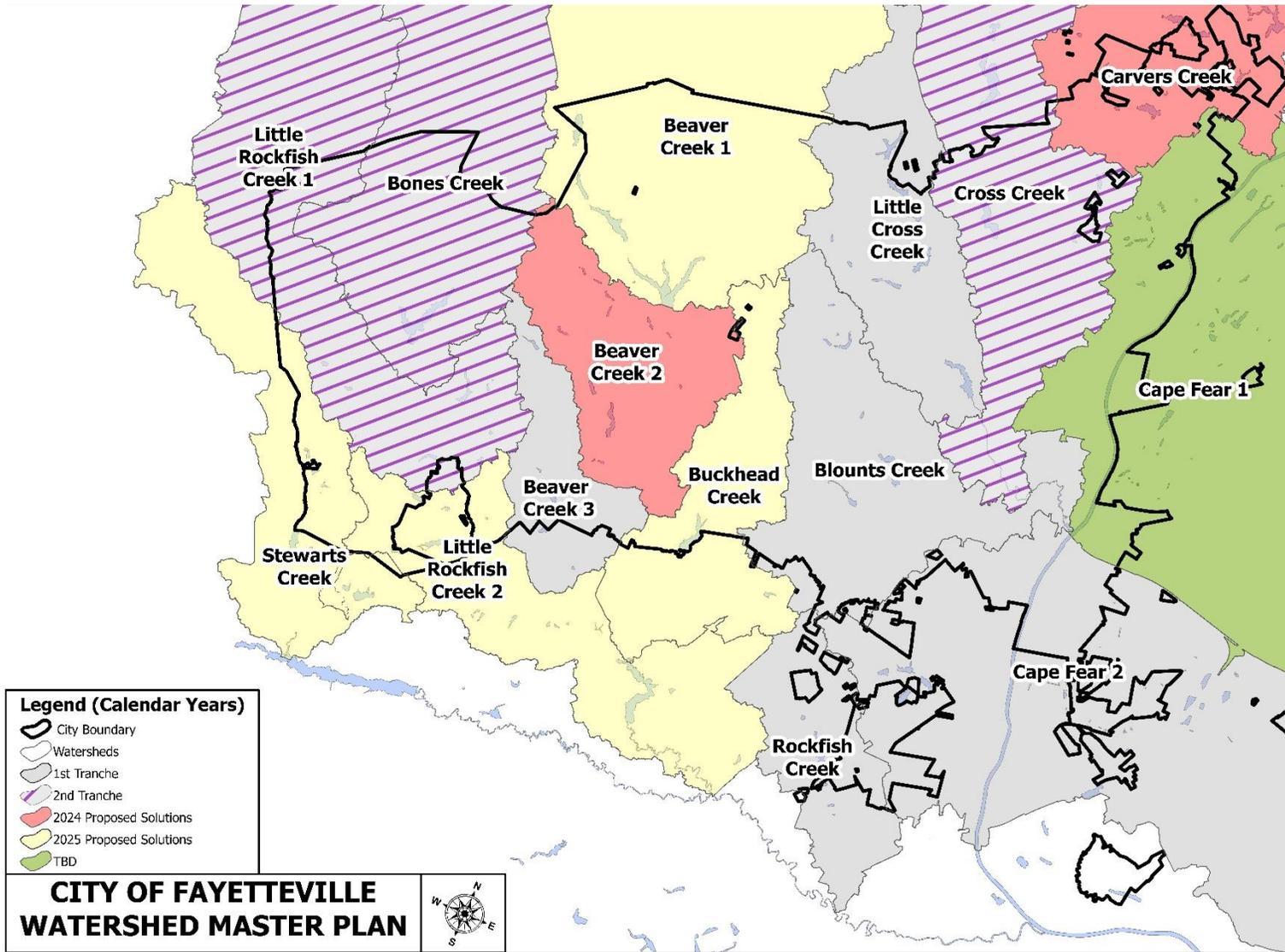
Number of Traverse Road Crossings
 Identified – 135 | Resolved – 62

Number of Disconnected Structures
 Identified – 1,099 | Resolved – 867

Number of Impacted Structures

	10-yr	25-yr	50-yr
Identified	264	363	380
Resolved	159	183	220

Current Estimated Total Cost \$525M



Study Area

266 – Total Sub-basins
 63 – Priority I Sub-basins
 14.1 – Sq. Miles

Study Identified

214 – Concern Areas (CAs)
 116 – CAs Selected
 111 – Proposed Solutions

Miles of Impacted Lane Length
 Identified – 76.3 | Resolved – 64.1

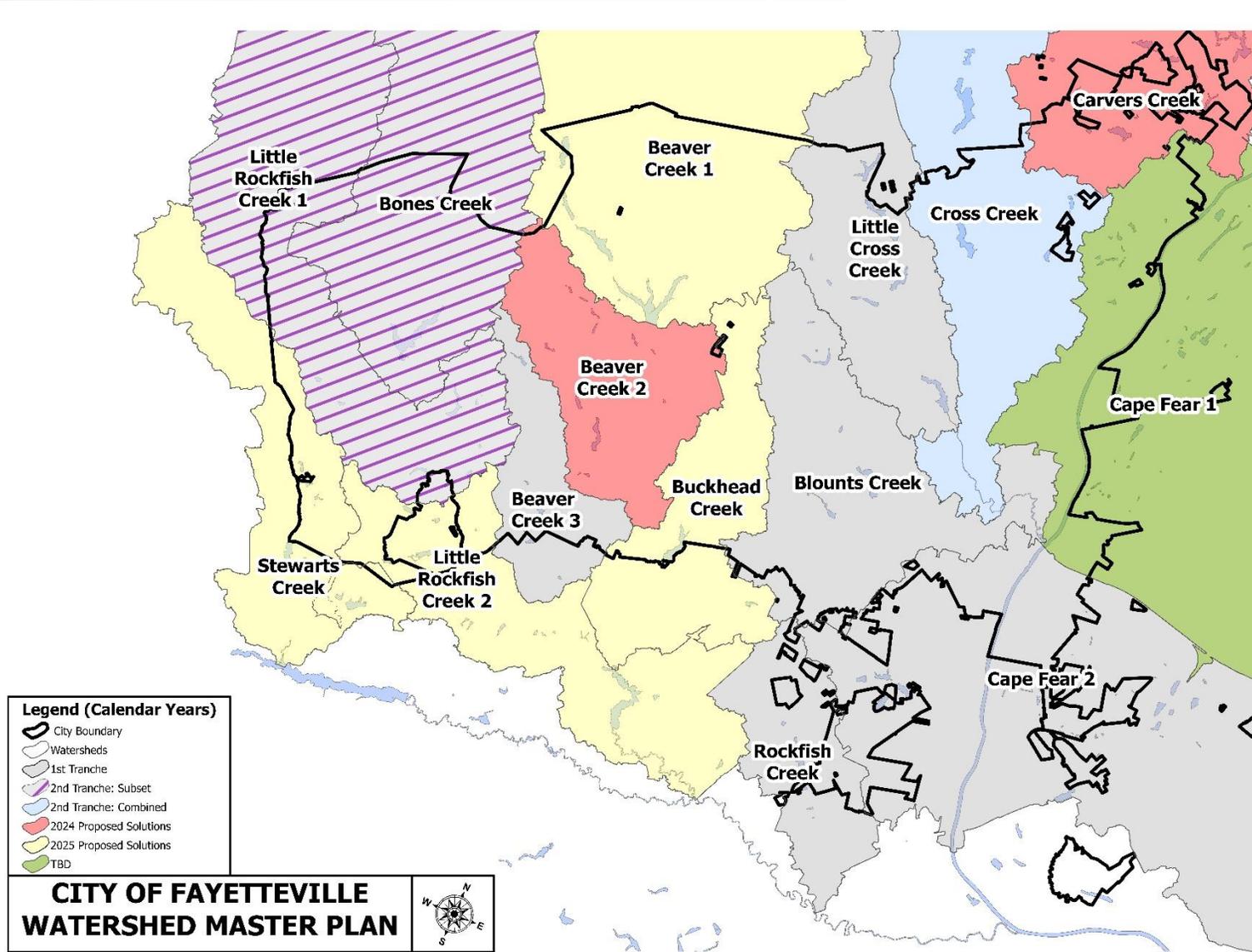
Number of Traverse Road Crossings
 Identified – 450 | Resolved – 353

Number of Disconnected Structures
 Identified – 61 | Resolved – 59

Number of Impacted Structures

	10-yr	25-yr	50-yr
Identified	237	374	444
Resolved	170	278	332

Current Estimated Total Cost \$470.4M



Study Area

173 – Total Sub-basins
21 – Priority I Sub-basins
9.74 – Sq. Miles

Study Identified

107 – Concern Areas (CAs)
33 – CAs Selected
28 – Proposed Solutions

Miles of Impacted Lane Length
Identified – 15.1 | Resolved – 8.8

Number of Traverse Road Crossings
Identified – 45 | Resolved – 11

Number of Disconnected Structures
Identified – 34 | Resolved – 32

Number of Impacted Structures

	10-yr	25-yr	50-yr
Identified	121	182	202
Resolved	85	129	141

Current Estimated Total Cost \$90M

Study Area

72 – Total Sub-basins
 7 – Priority I Sub-basins
 1.65 – Sq. Miles

Study Identified

19 – Concern Areas (CAs)
 12 – CAs Selected
 8 – Proposed Solutions

Miles of Impacted Lane Length
 Identified – 5.45 | Resolved – 1.81

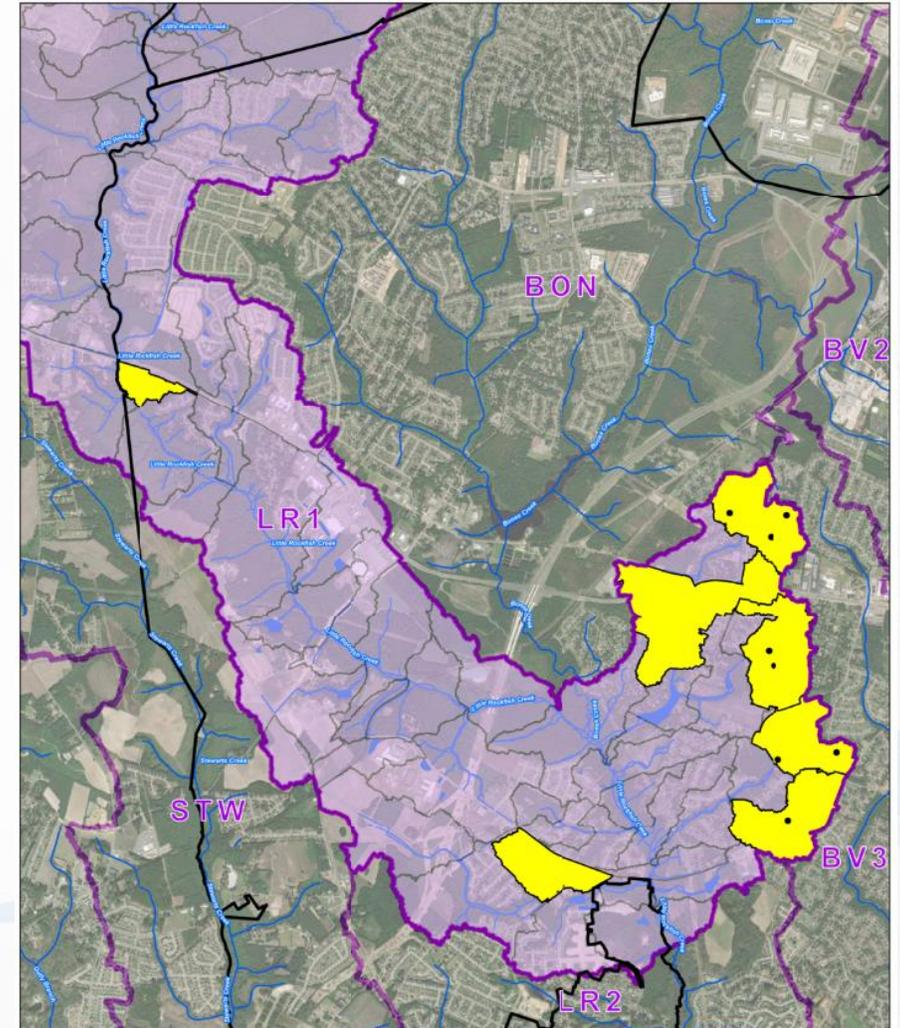
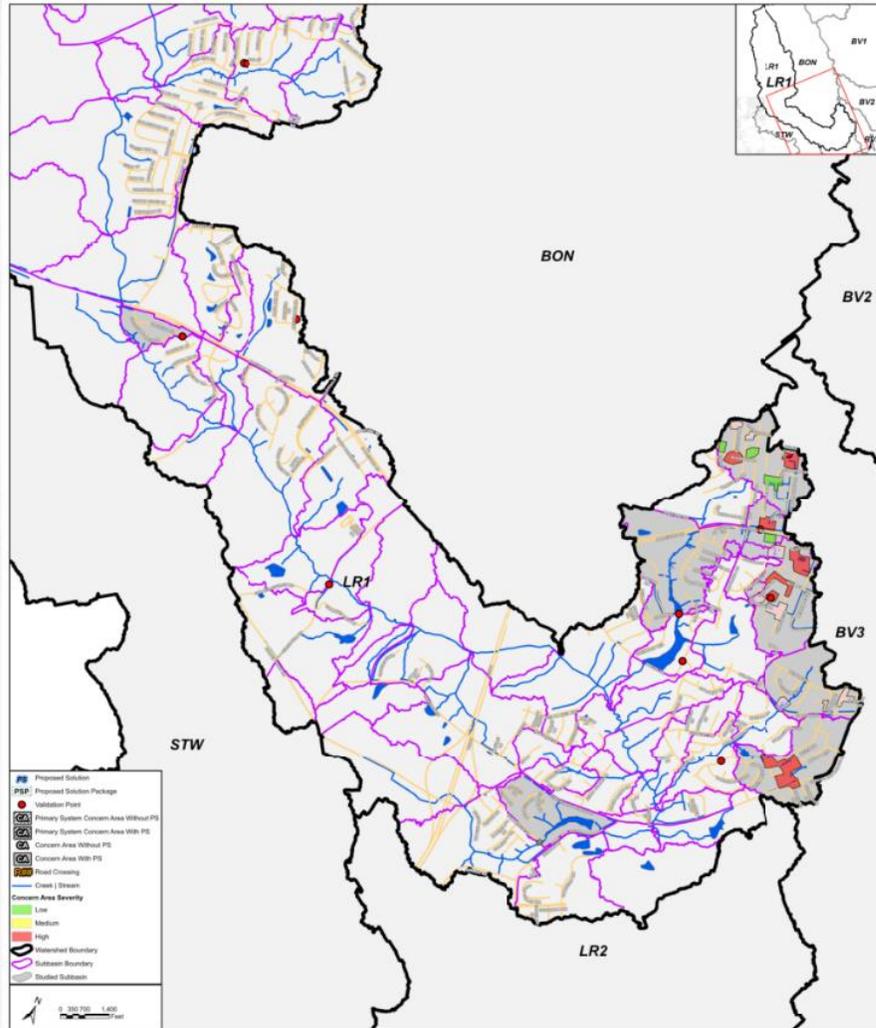
Number of Traverse Road Hazards
 Identified – 11 | Resolved – 3

Number of Disconnected Structures
 Identified – 27 | Resolved – 27

Number of Impacted Structures

	10-yr	25-yr	50-yr
Identified	34	59	66
Resolved	15	32	37

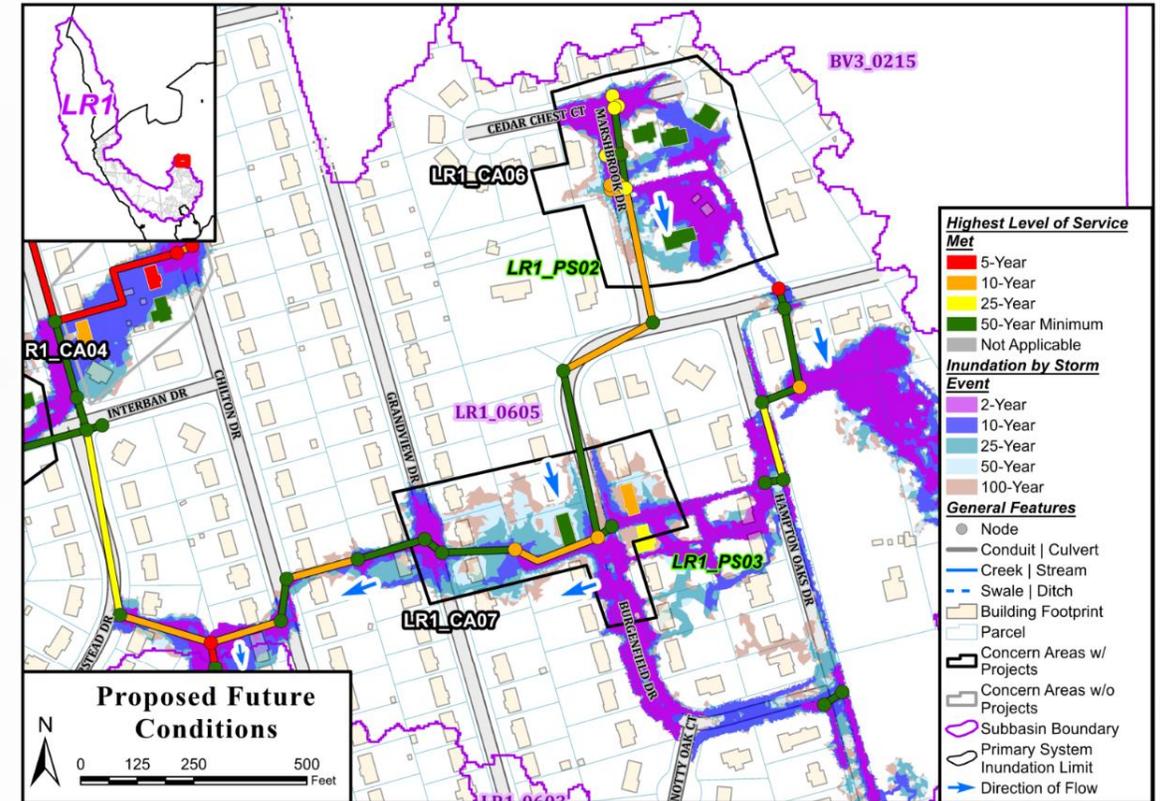
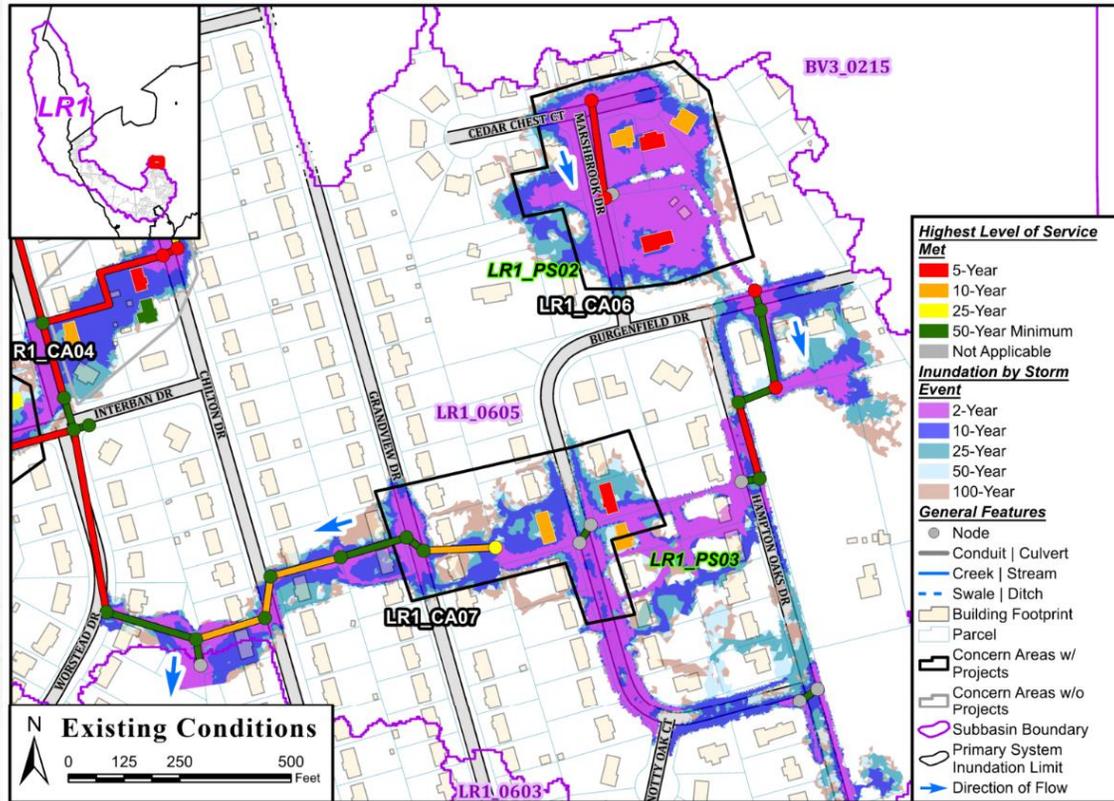
Current Total Cost \$ 27M



Little Rockfish Creek 1 Top Proposed Solutions

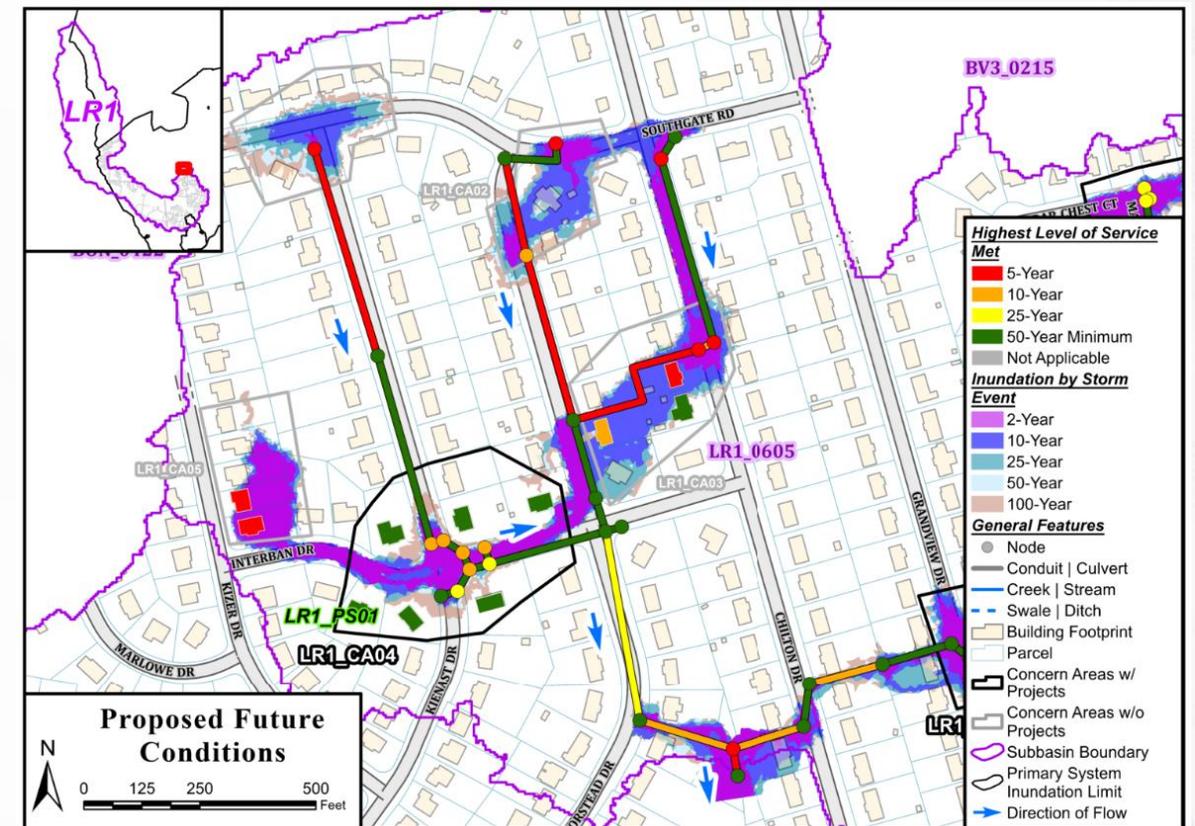
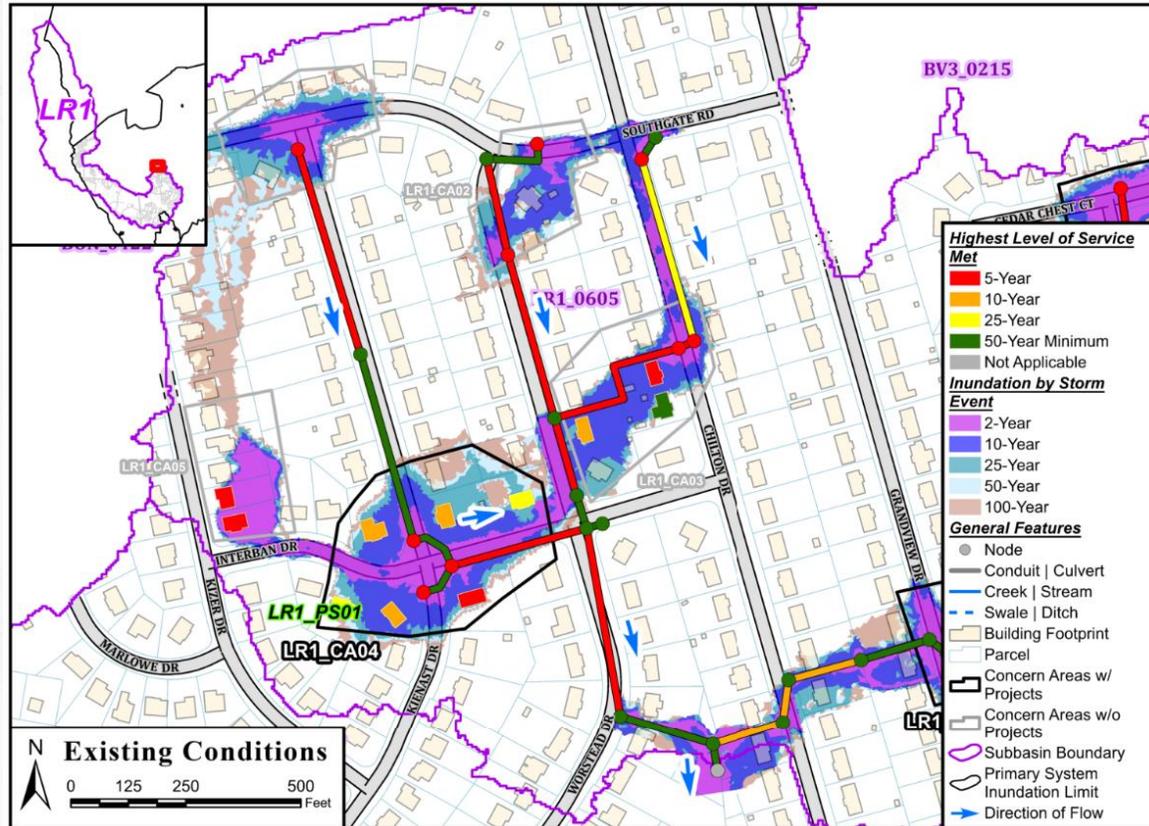
Storm	Proposed Solution Description	Score Rank	Efficacy	Proposed Solution Cost (2023)
PS02 (CA06) and PS03 (CA07)	Cedar Chest Ct & Marshbrook Dr	21	71%	\$3.7M
PS01 (CA04)	Interban Dr & Kienast Dr	12	79%	\$3.3M
PS12 (CA20)	Amanda Cir	12	81%	\$3.9M





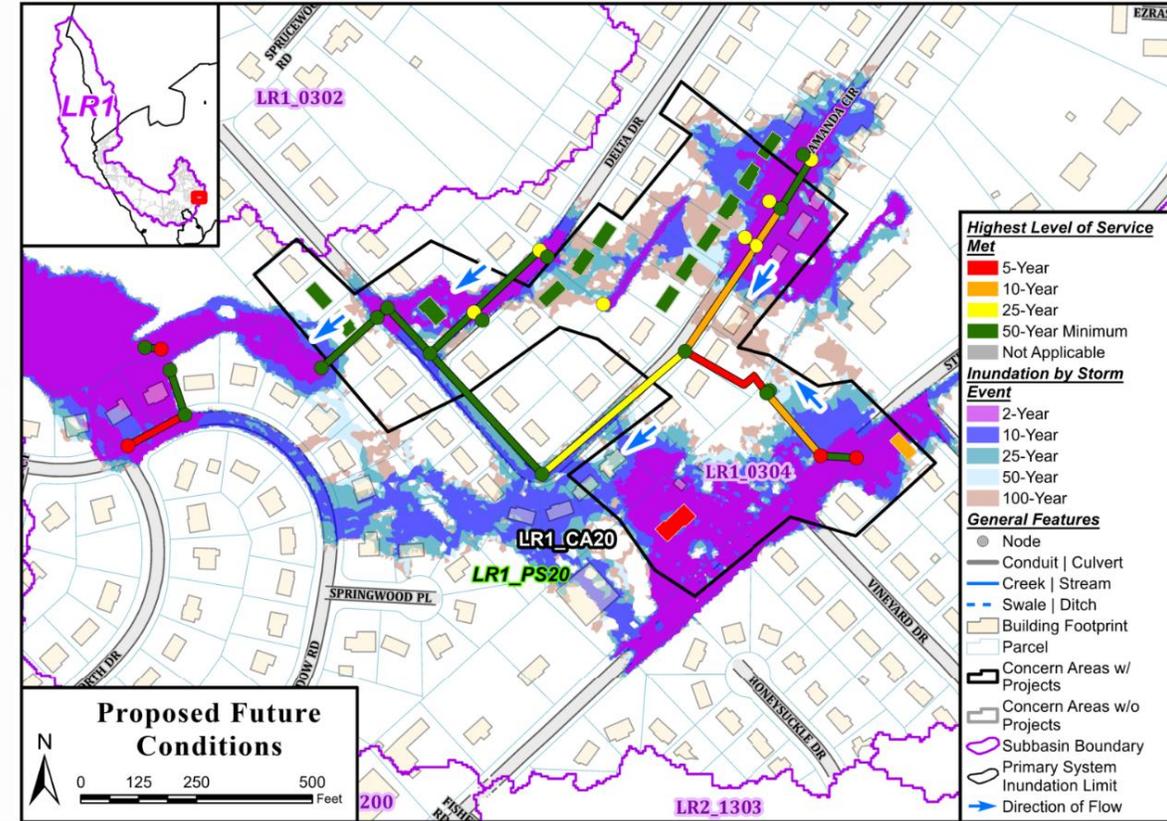
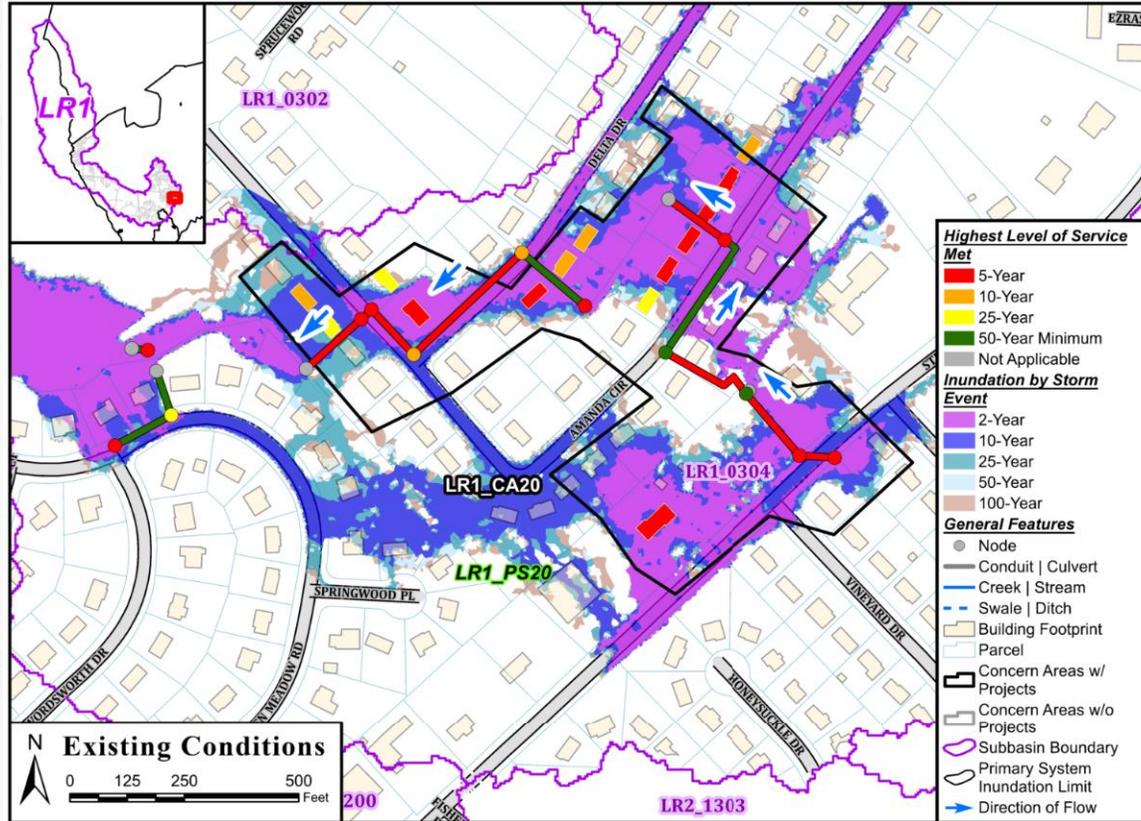
- Council District 7
- Little Rockfish Creek 1
- Proposed Solution = Pipe upsizing
- CA Score = 21
- Efficacy = 71%

- Estimated Cost = \$3.7M
- Reduces 820 LF of impacted lane length
- Eliminates impacts to 5 structures from 10-, 25-, & 50-yr event
- Provides access to 18 houses during the 50-year event



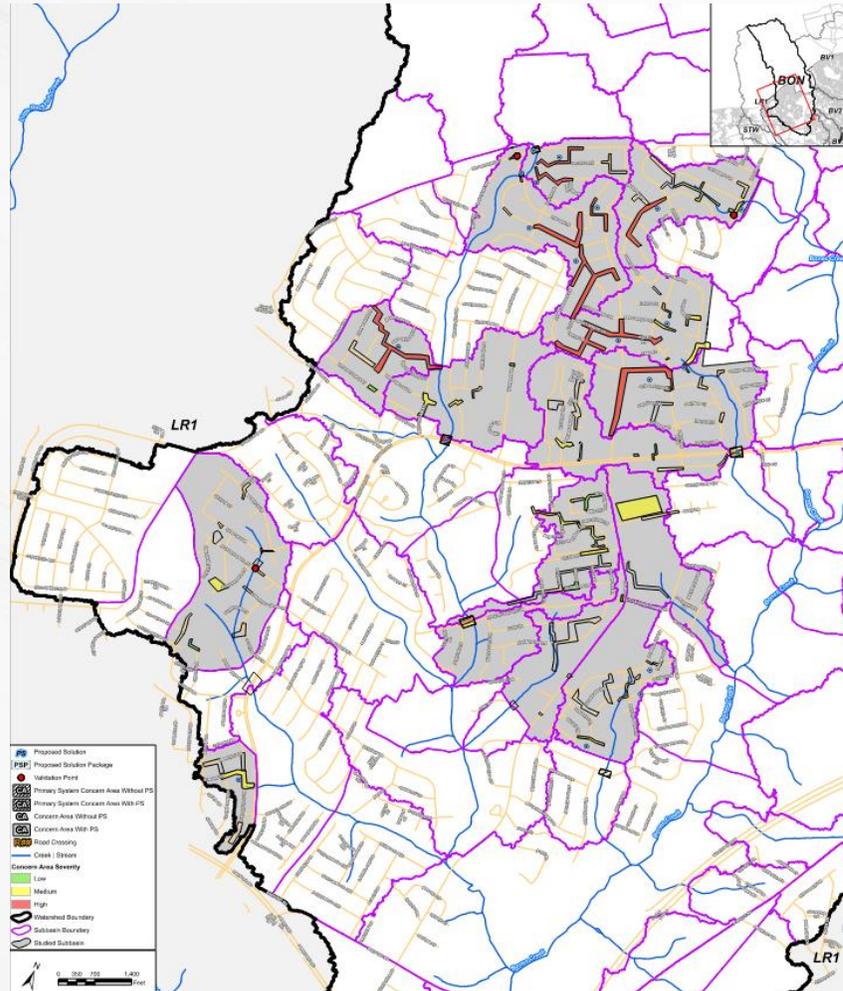
- Council District 7
- Little Rockfish Creek 1
- Proposed Solution = Pipe upsizing
- CA Score = 12
- Efficacy = 79%

- Estimated Cost = \$3.3M
- Reduces 720 LF of impacted lane length
- Eliminates impacts to 6 structures from 10-, 25-, & 50-yr event



- Council District 6
- Little Rockfish Creek 1
- Proposed Solution = Pipe upsizing
- CA Score = 12
- Efficacy = 81%

- Estimated Cost = \$3.9M
- Reduces 3700 LF of impacted lane length
- Eliminates impacts to 12 structures from 25-yr event



Study Area

- 101 – Total Sub-basins
- 14 – Priority I Sub-basins
- 8.09 – Sq. Miles

Study Identified

- 88 – Concern Areas (CAs)
- 21 – CAs Selected
- 20 – Proposed Solutions

Miles of Impacted Lane Length
Identified – 9.6 | Resolved – 7.0

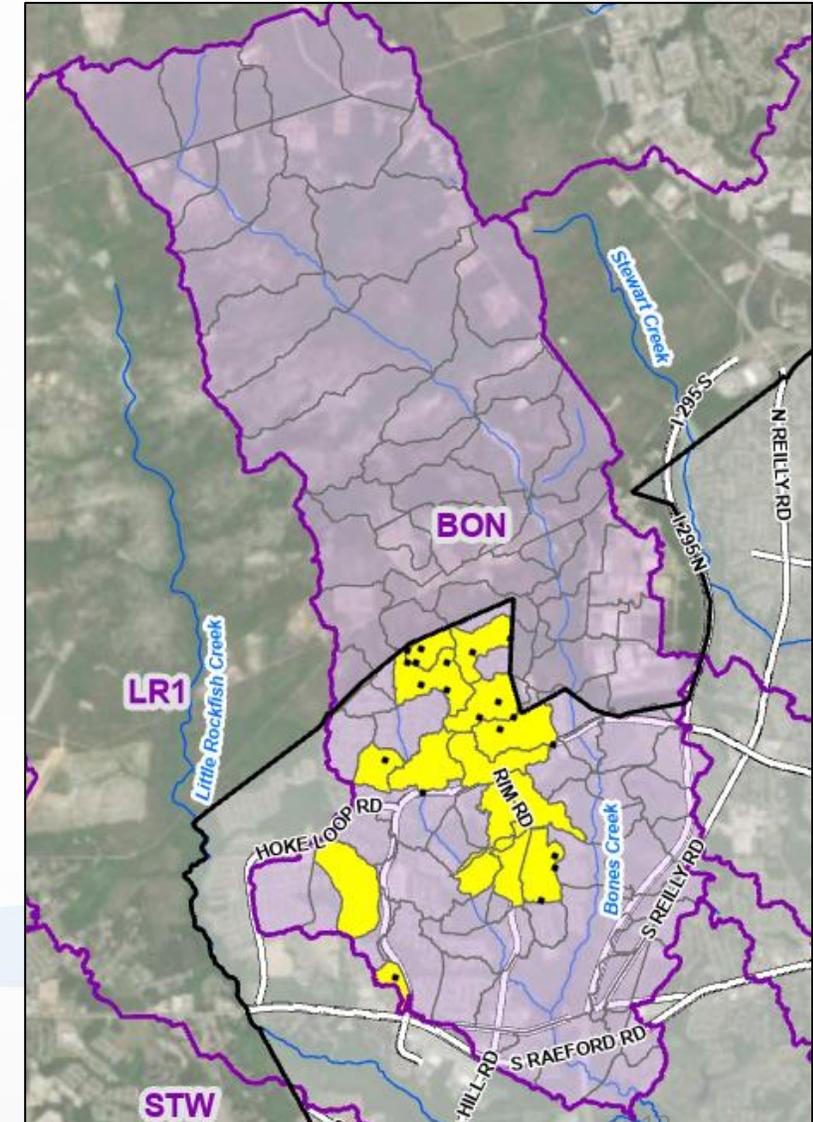
Number of Traverse Road Crossings
Identified – 34 | Resolved – 8

Number of Disconnected Structures
Identified – 7 | Resolved – 5

Number of Impacted Structures

	10-yr	25-yr	50-yr
Identified	87	123	136
Resolved	70	97	104

Current Total Cost \$63M

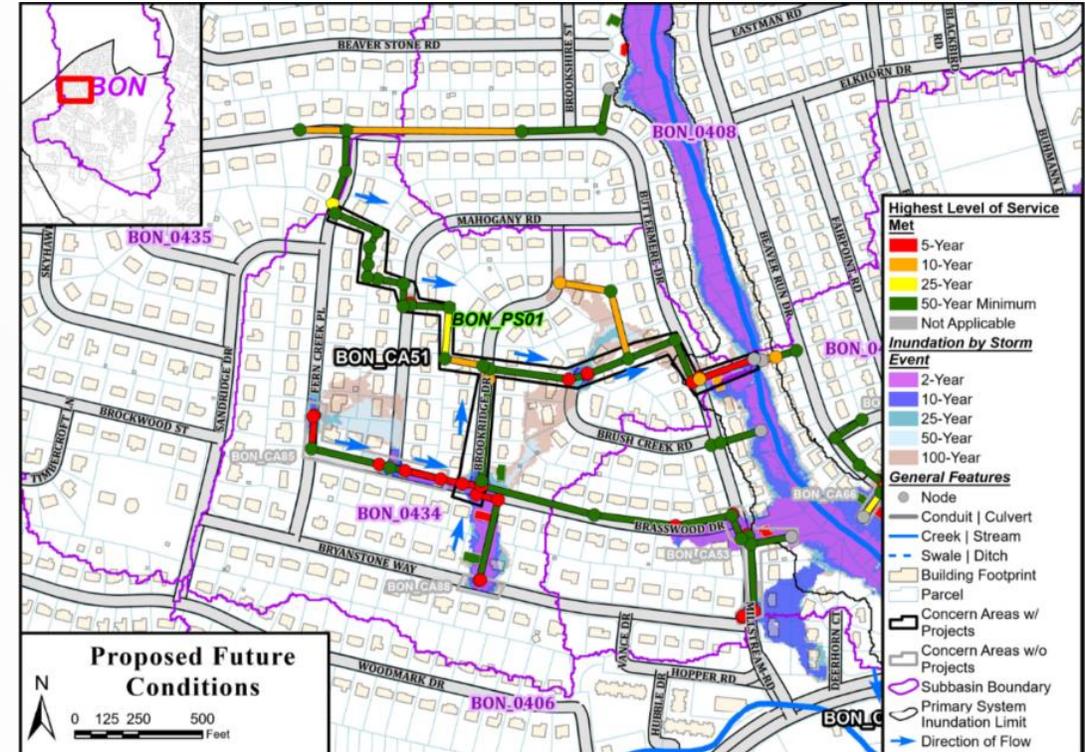
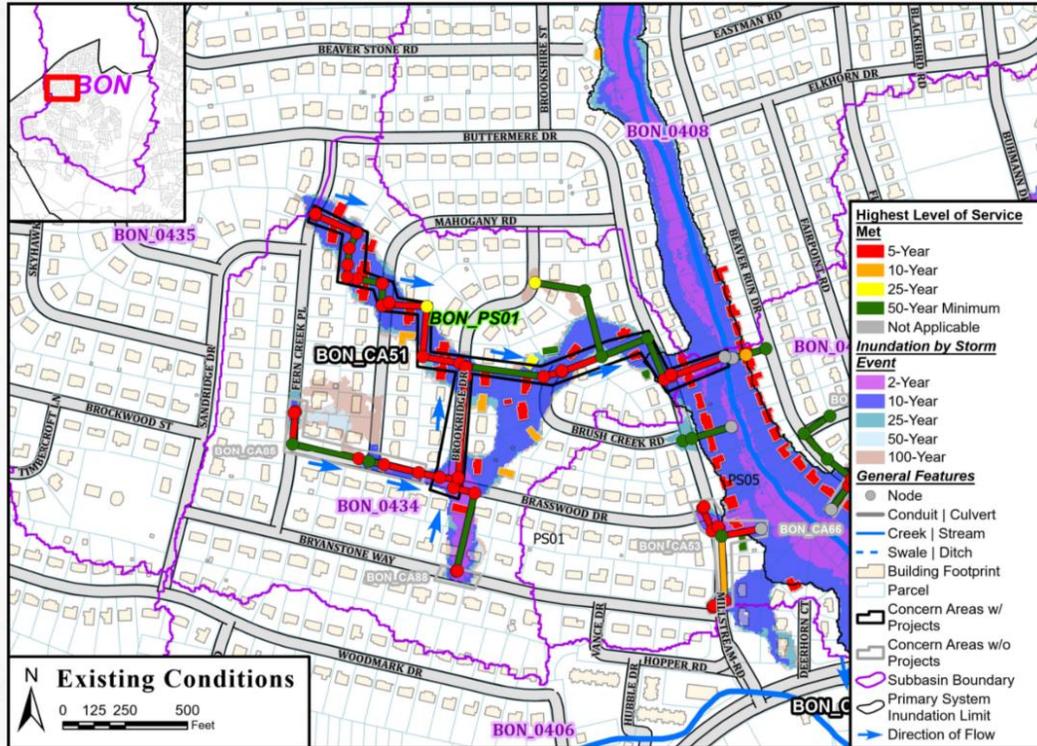


Bones Creek

Top Proposed Solutions

Solution #	Proposed Solution Description	Score	Efficacy	Cost
PS01 (CA51)	Fern Creek Pl. to Buttermere Dr.	29	79%	\$7.5M
PS02 (CA10)	Pin Oak Ln. & Avila Dr.	12	100%	\$8.0M
PS05 (CA67)	Cliffdale Rd. near Beaver Run Dr.	16	86%	\$5.1M
PS08 & PS09 (CA76 & CA77)	Brookshire St. & Pin Oak Ln.	3	100%	\$1.4M

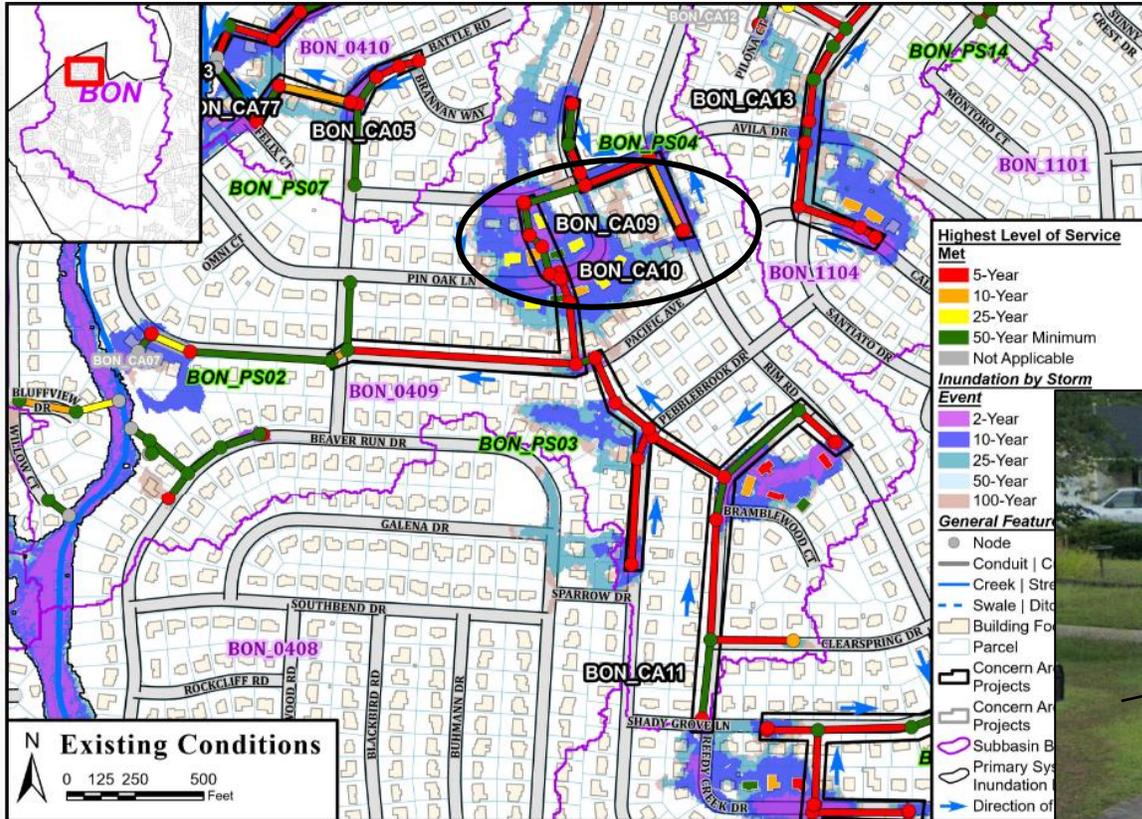
PS01 (CA51) Fern Creek Pl. to Buttermere Dr.



- Council District 8
- Proposed Solution = Diversion
- CA Score = 29
- Efficacy = 79%

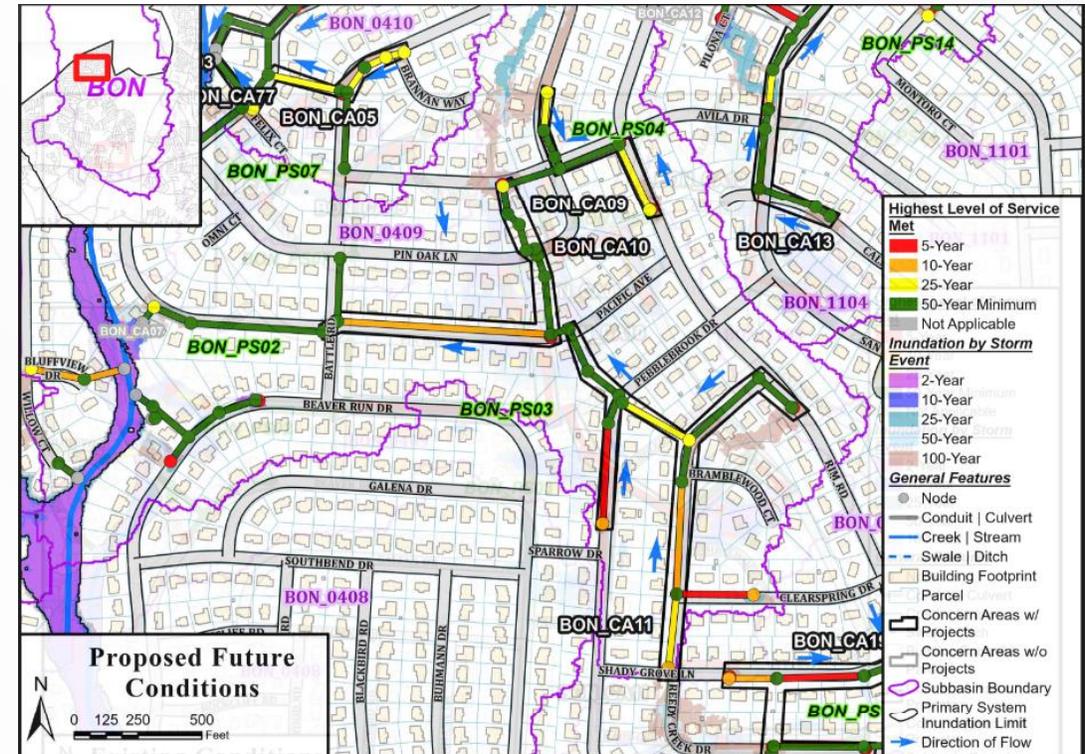
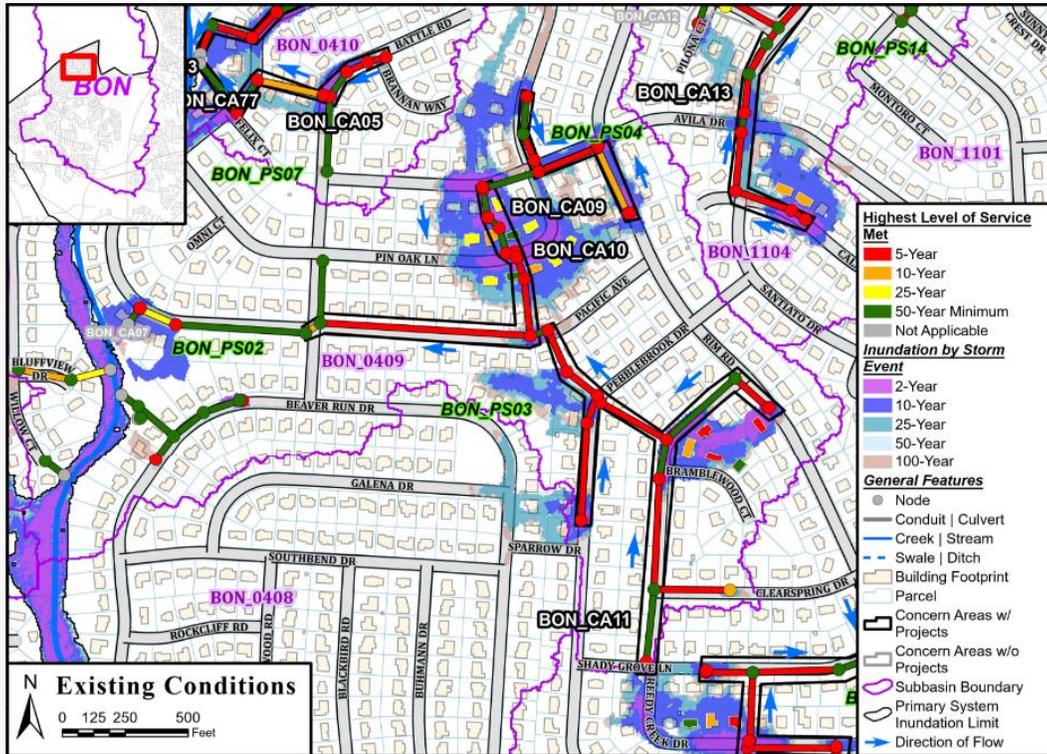
- Estimated Cost = \$7.5M
- Reduces 1962 LF of impacted lane length
- Eliminates Impacts to 24 Structures from 10-, 25-, & 50-yr events

PS02 (CA10) Pin Oak Ln. & Avila Dr.



- Assumed 6/27/2023 event – approx. 2.9 inches of rain
- 25-year, 24-hour design rainfall = 6.7 inches

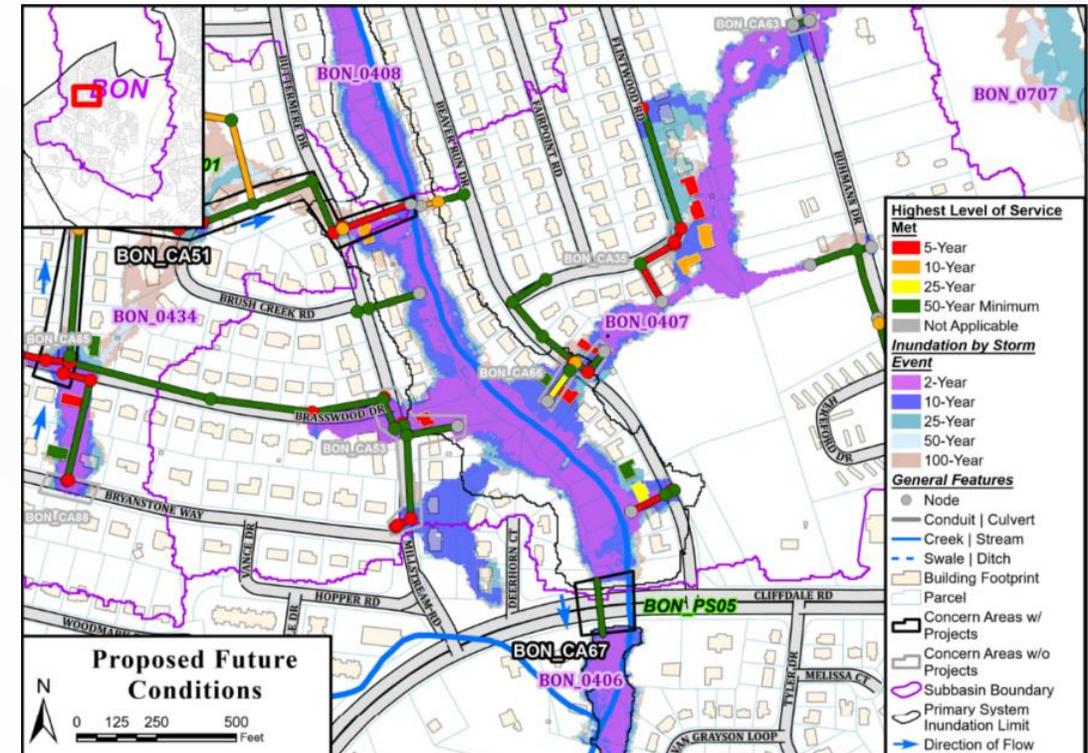
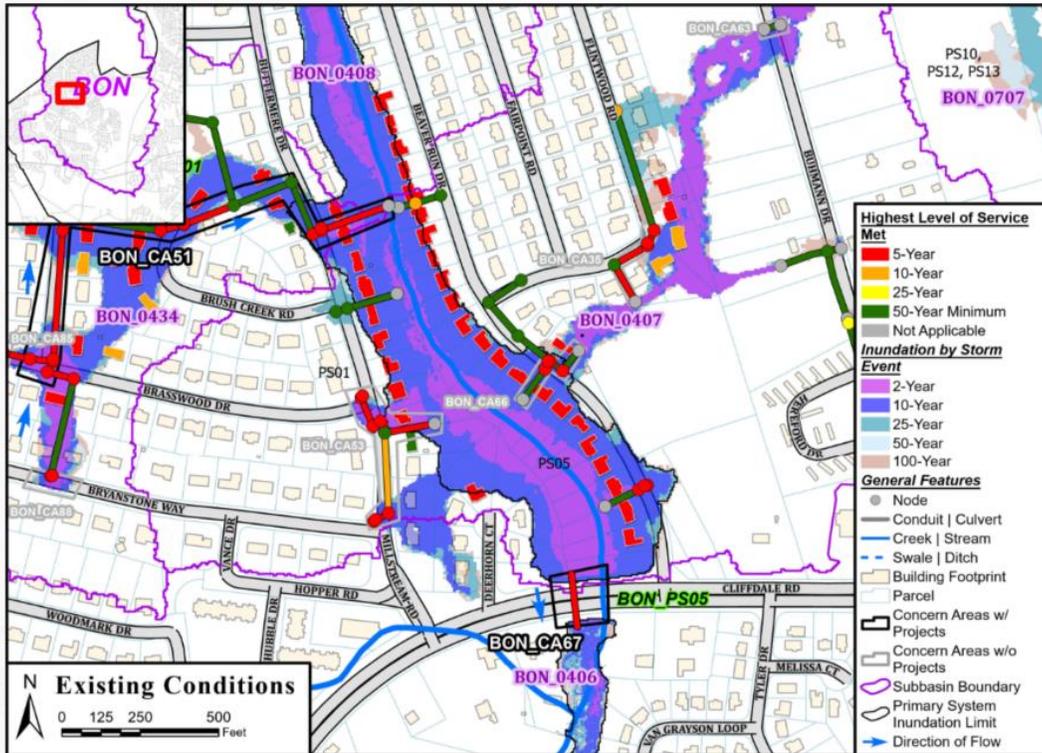
PS02 (CA10) Pin Oak Ln. & Avila Dr.



- Council District 8
- Proposed Solution = Upsize System
- CA Score = 12
- Efficacy = 100%

- Estimated Cost = \$8.0M
- Reduces 1988 LF of impacted lane length
- Eliminates Impacts to 8 Structures from 10-, 25-, & 50-yr events

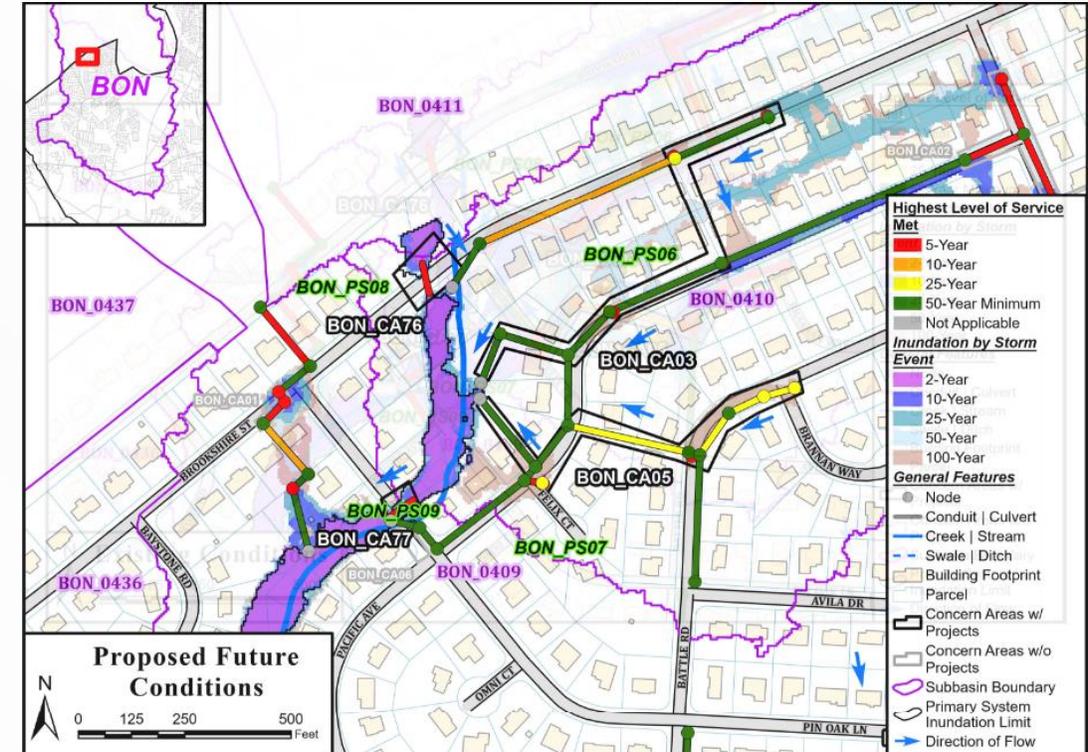
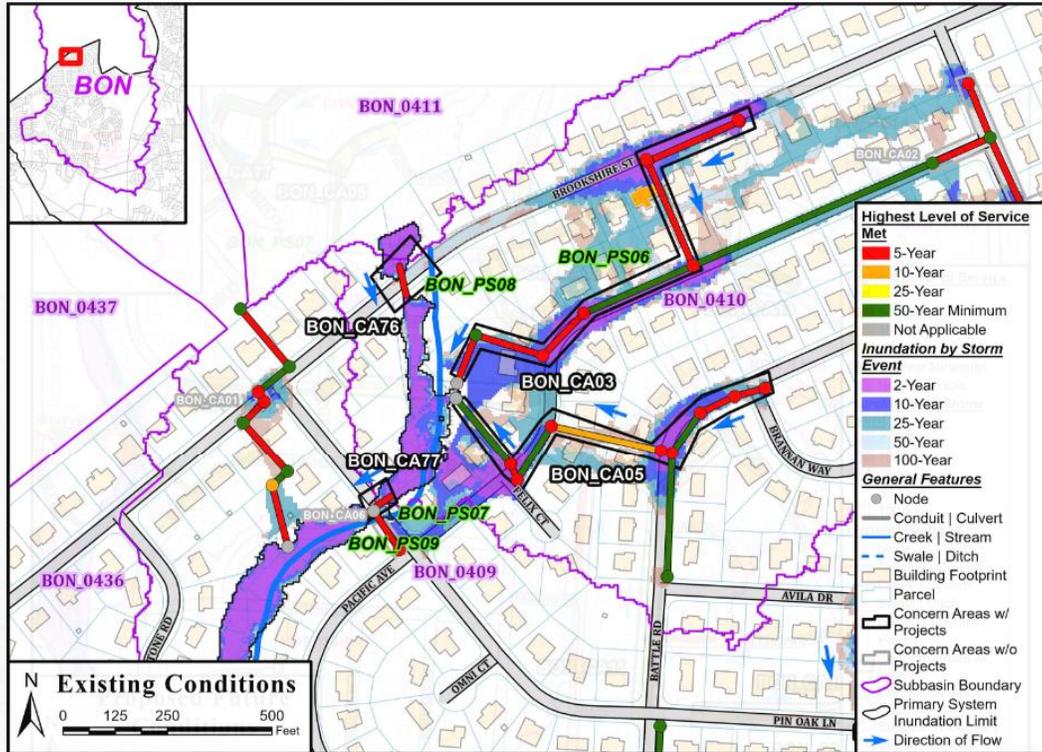
PS05 (CA67) Cliffdale Rd. near Beaver Run Dr.



- Council District 7 & 8
- Proposed Solution = Upsize NCDOT Culvert
- CA Score = 16
- Efficacy = 86%

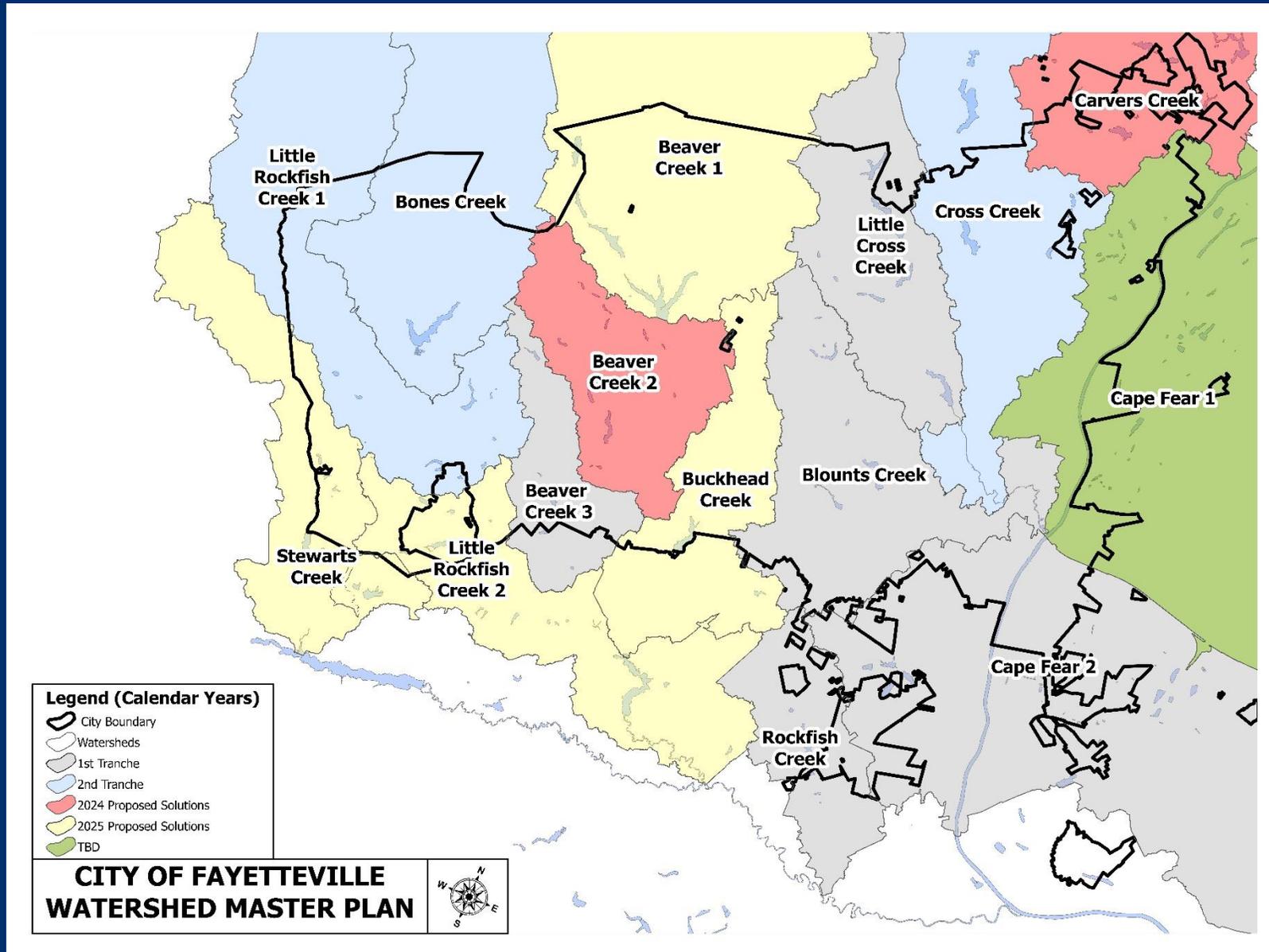
- Estimated Cost = \$5.1M
- Reduces 1,150 LF of impacted lane length
- Eliminates Impacts to 32 Structures from 10-, 25-, & 50-yr events

PS08 and PS09 (CA76 and CA77) Brookshire St. & Pin Oak Ln.



- Council District 8
- Proposed Solution = Upsize Culverts
- CA Scores = 3
- Efficacy = 100%

- Estimated Cost = \$1.4M
- Reduces 240 LF of Impacted Lane Length



Options:

1. Council provides consensus to approve the 28 proposed solutions from the Little Rockfish Creek 1 and Bones Creek watershed studies to enable staff to program them into the annual CIP prioritization process and pursue grants as applicable.
2. Council does not provide consensus to approve the 28 proposed solutions from the Little Rockfish Creek 1 and Bones Creek watershed studies and remands back to staff with additional guidance.

Recommended Action:

Council provides consensus to approve the 28 proposed solutions from the Little Rockfish Creek 1 and Bones Creek watershed studies to enable staff to program them into the annual CIP prioritization process and pursue grants as applicable.



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